UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,049	02/13/2002	Osamu Nabeta	M1971-107	8629

7278 7590 02/28/2003

DARBY & DARBY P.C.
P. O. BOX 5257
NEW YORK, NY 10150-5257

EXAMINER	
DOTE, JANIS L	

ART UNIT	PAPER NUMBER
1756	8

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/076,049	Applicant(s) NABETA et al.
	Examiner J. DOTE	Group Art Unit 1756

—The MAILING DATE of this communication appears on th cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 7/9/02.

☐ This action is ~~FINAL~~.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1 - 7 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1 - 7 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or electi n requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some* ☐ None of the:

☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5

☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice f Informal Patent Applicati n, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other _____

Office Action Summary

1. The abstract of the disclosure is objected to because it is not limited to a single paragraph. Correction is required. See MPEP § 608.01(b). Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The following term is a means-plus-function limitation covered by the 35 U.S.C. 112, sixth paragraph: "means for electrophotography processing that are placed on the periphery of said photosensitive body." The specification at page 13,

lines 3-5, discloses "means for electrophotography processing, such as charging, light exposure, developing, transferring, cleaning, and the like." The only definition of such means is provided by instant Fig. 3 and equivalents thereof. Fig. 3 comprises a charging device **35**, a light exposure system **36**, a developing system **37**, a transfer system **39**, a cleaning system **43**, and a charge removal system **44**. The specification further discloses that the transfer system comprises an intermediate transfer belt **40** and a transfer device **41**. See the instant specification at page 31, lines 17-22, and Fig. 3.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3 and 4 are indefinite in the phrase "bisphenol Z-type polycarbonate resin" (emphasis added) because it is not clear what is the scope of term "Z-type." It is not clear whether the polycarbonate resin is a bisphenol Z polycarbonate

resin or whether it merely has some (unspecified) properties of a bisphenol Z polycarbonate resin.

5. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted element is a conductive support.

Instant claims 1-4 recite an endless flexible single-layer positively charged organic photosensitive body. Instant claims 5-7 recite an image forming device comprising an endless flexible single-layer positively charged organic photosensitive body. However, the instant claims fail to recite that the photosensitive body comprises a conductive substrate. According to the specification, the endless flexible single-layer photosensitive body recited in the instant claims is used in "monochrome and color printers with electrophotography systems, copiers, facsimiles, light printing presses, and the like." Specification, page 1, lines 5-8. The instant specification discloses endless flexible single-layer positively charged organic photosensitive bodies comprising a conductive layer on top of a support body or on a conductive belt support body. See Figs. 1 and 2; page 14, line 20; and page 15, lines 14-20 and 13-20. A conductive support is essential to form an electrostatic latent image. See Diamond, Handbook of Imaging

Materials, pp. 395-396. Diamond's Figure 9.7 is a typical dual photoreceptor, which comprises an electrode layer. It is not clear how a photosensitive body that lacks a conductive substrate can form an electrostatic latent image and be used in electrophotography systems.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. A conductive substrate is critical or essential to the practice of the invention. Claims 1-7 do not recite the presence of a conductive support. Therefore, claims 1-7 are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Instant claims 1-7 recite an endless flexible single-layer positively charged organic photosensitive body as described in paragraph 5, supra, which is incorporated herein by reference.

According to the specification, the endless flexible single-layer photosensitive body recited in the instant claims is used in "monochrome and color printers with electrophotography systems, copiers, facsimiles, light printing presses, and the like." Specification, page 1, lines 5-8. The instant specification discloses endless flexible single-layer positively charged organic photosensitive bodies comprising a conductive layer on top of a support body or on a conductive belt support body. See Figs. 1 and 2; page 14, line 20; and page 15, lines 14-20 and 13-20. A conductive support is essential to form an electrostatic latent image. See Diamond, Handbook of Imaging Materials, pp. 395-396. Diamond's Figure 9.7 is a typical dual photoreceptor, which comprises an electrode layer. All the evidence in the instant specification indicates that a photosensitive body used in electrophotographic processes that does not comprise a conductive support cannot form an electrostatic latent image. Hence, on the present record, it would require undue experimentation for one of ordinary skill in the art to use an endless flexible single-layer organic photosensitive body that does not have a conductive support to form an electrostatic latent image. The full scope of the instant claimed subject matter cannot be practiced based on the limited disclosure provided by the instant specification.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,629,117 (Katsukawa) combined with Diamond, Handbook of Imaging Materials, pages 395-396, and US 5,737,669 (Ring).

Katsukawa discloses a positively charged single-layer photosensitive member comprising a conductive support and a photosensitive layer that is within the compositional limitations recited in instant claims 1-4. The photosensitive layer comprises 5 parts by weight of titanyl phthalocyanine, 30 parts by weight of an electron transport material, 50 parts by weight of a particular benzidine compound as the hole transport material, and 100 parts by weight of the polycarbonate Z resin (2-2) having a viscosity-average molecular weight of 20,000 to 25,000. See polycarbonate Z resin (2-2) at col. 8; examples 327, 335, 343, 351, and 359 in Tables 48 through 52, respectively; and col. 55, line 36, to col. 56, line 6. The viscosity-average molecular weight of 20,000 to 25,000 is within the range of 20,000 or greater recited in instant claim 2. Polycarbonate Z resin (2-2) is present in an amount of 54% by weight of the total weight of the photosensitive layer. (The weight percentage was determined from the amounts used in the examples.) The weight percentage of 54% is within the range of 40 to 70% recited instant claim 2. Katsukawa discloses that its photosensitive member has superior mechanical strength and repeat characteristics. Col. 1, line 65, to col. 2, line 1. The photosensitive member also has a high sensitivity and a high glass transition temperature. Col. 2, lines 1-2.

Katsukawa does not exemplify the use of an endless flexible substrate as recited in the instant claims. However, Katsukawa does not limit the type of conductive substrate used. Katsukawa discloses that the "[a]s the conductive substrate . . . various materials having conductivity can be used." Col. 26, lines 22-26. Katsukawa also discloses that the conductive substrate may be in the form of a sheet, and that the substrate may be "plastic materials vapor-deposited or laminated with . . . metal." Col. 26, lines 28-30 and 33.

As shown in Diamond, it is well-known in the art that an image loop (i.e., endless belt) can be fabricated from a flexible web comprising a conductive layer and a photoreceptor layer where the ends of the web are joined together to form an endless belt. Diamond, page 396, lines 4-5. The photoreceptor layer may be a single layer. Page 395, line 27.

According to Ring, the laser or LED-array printer comprising a photoreceptive image-carrying drum has several disadvantages. See Ring, col. 1, line 36, to col. 2, line 9. For example, Ring discloses that the "the drum . . . and the [other] elements positioned adjacent the drum surface are relatively large elements since they all must be at least as wide as a sheet of a printing medium, on the order of 8.5 to 12 inches or larger." Col. 1, lines 37-42. Ring also discloses that "if an LED-array head is employed . . . the head must be at least as wide as the

drum . . . so that an electrostatic image is formed on the drum surface during a single pass of the drum." Ring discloses that "if a laser is employed, relatively sophisticated mirrors and/or prisms must be employed for the same purpose." The "relatively long LED-array head or the lasers and related optical devices represent a significant portion of the cost of producing the drum printer." Col. 1, lines 46-55. To overcome these disadvantages, Ring discloses a small-scale and inexpensive electrophotographic printer comprising a photoreceptive member in the form of an endless belt **20** stretched over rollers **26a** and **26b**. Fig. 2; col. 4, lines 20-36; and col. 4, line 50, to col. 5, line 52. According to Ring, its electrophotographic printer requires a relatviely short LED array and can form multichrome or color images at a relatively low cost. Col. 9, lines 39-45.

It would have been obvious to a person having ordinary skill in the art, in view of the combined teachings of Katsukawa, Diamond, and Ring, to use a flexible web support coated with a conductive layer as taught by Diamond and Katsukawa as the conductive support in the positively chargeable single organic photosensitive member taught by Katsukawa, and to form an endless belt from the resulting photosensitive member as taught by Diamond. That person would have had a reasonable expectation of successfully obtaining an endless flexible positive charged

single layer photosensitive member having the properties disclosed by Katsukawa that is capable of being used in a small-scale electrophotographic printer as taught by Ring that is capable of providing multichrome and color images at a relatively low cost.

11. Claims 1, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,198,889 B1 (Yu) combined with European Patent 574,154 A1 (EP'154).

Yu discloses an electrophotographic copying apparatus comprising an endless flexible electrophotographic photoreceptor belt **10** which is stretched over a plurality of cylindrical rollers **12**, **14**, **16**, and **18**, a charging station **31**, an image exposure station **33**, and image development stations **41**, **42**, **43**, and **44**, cleaning station **22**. See Fig. 2, and col. 8, lines 44-65. Yu further discloses that generally small diameter support rollers having a diameter of 1.9 cm (i.e., 19 mm) are used for simple, reliable copy paper stripping systems in electrophotographic imaging apparatus using a photoreceptor belt system operating in a very confined space. Col. 3, lines 1-6. The other components besides the endless belt are arranged on the periphery of the endless belt. See Fig. 2. The other components meet the "means" limitation recited in instant claim 5 because

they are used in forming an image by an electrophotographic process. The diameter of 19 mm is within the range of 5 mm to 20 mm recited in instant claim 5. Yu exemplifies an endless flexible belt comprising a biaxially oriented thermoplastic polyester coated with titanium. See example 1 at col. 12.

Yu does not exemplify an endless flexible photoreceptor belt comprising a single photosensitive layer as recited in the instant claims.

EP'154 discloses the disadvantages of using dual-layer photoconductive layers comprising a charge generation layer and a charge transport layer. Accordingly to EP'154, the charge transport layers are required to have high carrier mobility and usually comprise hole transport materials. The photoconductors comprising said dual-layer photoconductive layer are negatively charged and produce a large amount of ozone due to a reaction with oxygen in the ambient air because the charge is caused by negative corona charge. Page 2, lines 17-21. The production of ozone results in environmental contamination and degradation of the photoconductors. Page 2, lines 21-22. EP'154 discloses that single-layer photoconductive layers including electron transport materials can be easily produced and have a number of advantages in the prevention of coating defects and improvement of optical characteristics of the photoconductor. Page 2, lines 39-41. EP'154 discloses a single positively charged photosensitive layer

that is within the compositional limitations recited in instant claim 1. The photosensitive layer comprises 3 parts by weight of titanyl phthalocyanine, 50 parts by weight of a particular electron transport material, 50 parts by weight of a hole transport material, and 100 parts by weight of a polycarbonate resin. Page 9, lines 24-25; page 10, lines 21-26; and example 9 in Table 1 at page 11. EP'154 discloses that its single positively charged photosensitive layer has extremely low residual potential and excellent sensitivity. Said photosensitive layer also can used in a rapid operation of a copying machine, a printer, or the like. Page 3, lines 4-50.

EP'154 does not exemplify the use of an endless flexible substrate as recited in the instant claims. However, EP'154 does not limit the type of conductive substrate used. EP'154 discloses that the "[a]s the conductive substrate . . . various conductive materials can be used." Page 8, lines 36-37. EP'154 also discloses that the conductive substrate may be a plastic material vapor-deposited or laminated with a metal. Page 8, lines 39-40.

It would have been obvious to a person having ordinary skill in the art, in view of the combined teachings of EP'154, to use the single positively charged photosensitive layer disclosed by EP'154 as the photosensitive layer in the endless flexible photoreceptor belt in the apparatus disclosed by Yu, because that

person would have a reasonable expectation of successfully obtaining an electrophotographic apparatus that does not produce ozone and has excellent sensitivity.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (703) 308-3625. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (703) 308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 (Rightfax) for after final faxes, and (703) 872-9310 for other official faxes.

Any inquiry of papers not received regarding this communication or earlier communications, or of a general nature or relating to the status of this application or proceeding should be directed should be directed to the Customer Service Center of Technology Center 1700 whose telephone number is (703) 306-5665.

Janis L. Dote
JANIS L. DOTE
PRIMARY EXAMINER
GROUP ~~1500~~ 1700

JLD
February 25, 2003